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A NEW FRESH-WATER SPONGE FROM SOUTH CAROLINA

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A NEW FRESH-WATER SPONGE FROM SOUTH CAROLINA[1]

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The first specimen of the new species of *Spongilla* described herein, containing gemmules, was collected from Horseshoe Pond in Lexington County, S.C., on December 3, 1930. Since then numerous specimens have been taken throughout the year for experimental purposes, all from shallow water. All were exposed to light and were green. This *Spongilla* grows on stems and leaves of various water plants that inhabit the pond and on dead twigs. It is relatively firm in texture and has a wide range in size. The largest specimen measured 12 cm long and 3 cm wide in the thickest part.

Genus SPONGILLA Lamarck

SPONGILLA DISCOIDES, new species

Gemmules.—These are dark brown, owing to the color of the chitinous coats. They occur singly throughout the sponge but are not abundant. Their shape is quite different from that of any described gemmule, as they are biconvex disks (figs. 1, 2). There is no foraminal aperture. They range in size from 348μ to 376μ in diameter by 110μ to 130μ at the center of the disk. The granular zone is confined to the peripheral region of the disk (fig. 1, *a*), and the air cells that make up this zone are large. The inner and outer chitinous coats are well developed and are closely applied to one another on the side of the discuslike gemmule cell mass (fig. 3). Near the edge of the discus, however, the two chitinous coats diverge, the inner coat remaining closely applied to the cell mass (fig. 3, *b*). The outer coat of one side of the disk meets that of the other side at the rim of the whole disk and forms a ridge (fig. 2, *a*). The outer surface of the outer chitinous coat is raised into ridges, which anastomose with one another to form polygons (fig. 1, *b*). In section these ridges show as projections from the outer coat (fig. 3, *d*).

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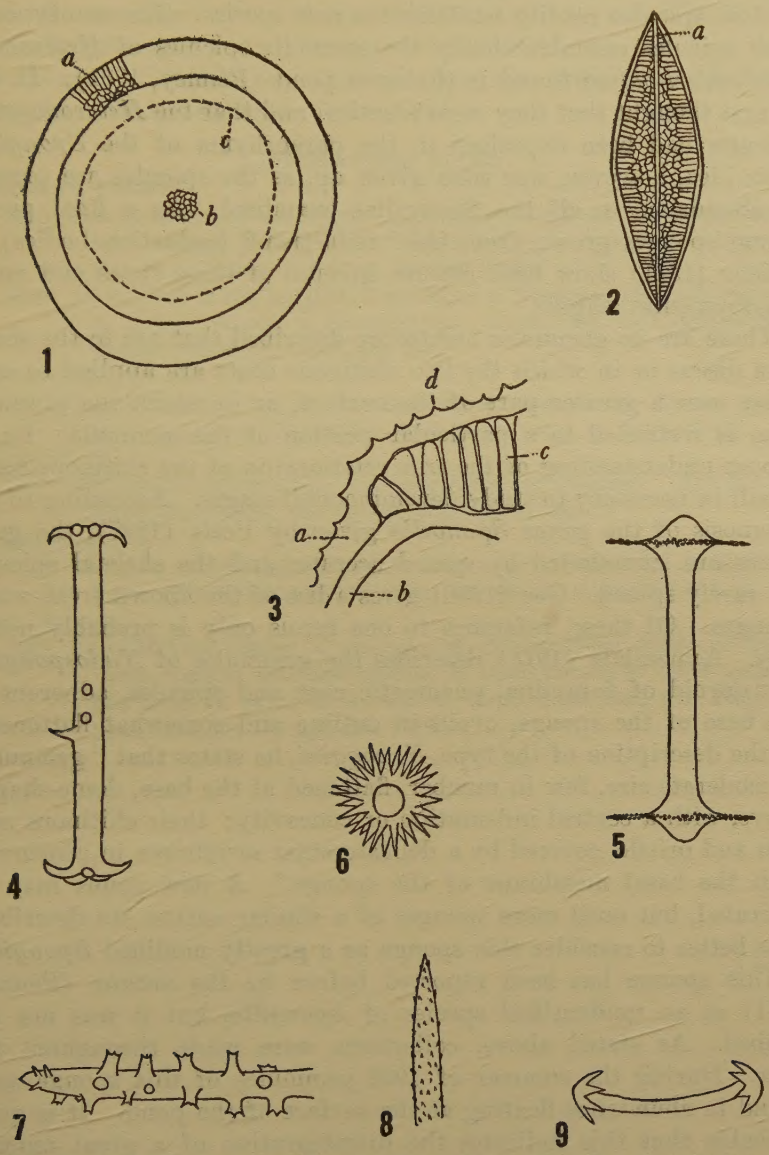
The space thus formed in this region between the inner and outer chitinous coats is filled with the air cells. In the regions where the two coats separate the air cells are in a single layer (fig. 3, *c*), but as the coats become more widely separated the cells are in several layers. This granular zone ranges from 48μ to 56μ in thickness. It is not charged with, nor is the gemmule surrounded by, gemmule spicules.

Skeletal spicules.—There are two types of skeletal spicules, both of which are spined. Those of one type, which are the more abundant, are slender and slightly curved. They taper to sharp points at both ends and bear numerous minute spines. These spines are perpendicular to the spicule at the center, but on each side of the center they are curved toward their respective ends of the spicule (fig. 8). While many of these spicules lie singly in the parenchyma, the majority are collected into bundles, which mark out a rough framework for the sponge. These bundles contain 2 to 10 spicules. Spicules of this type range from 185μ to 245μ in length by 3.9μ to 5.8μ in width. Those of the other type of skeletal spicule are straight and taper toward points at both ends. They bear prominent spines, which are subdivided at their extremities into 2 or 3 smaller spines (fig. 7). These spicules range from 135μ to 143μ in length by 3.5μ to 4.4μ in width. They are not abundant.

Dermal spicules.—These are small equibirotulates. Each rotule consists of a small inturned disk bearing 6 or 8 curved hooks, which are directed toward the rotule at the opposite end of the spicule. The shafts may be either straight or curved. They are entirely free from spines (fig. 9). These small birotulates measure from 19μ to 27μ in length by 1.75μ in diameter. The rotules range from 5μ to 7μ in diameter, including the hooks. These spicules are abundant in all specimens but are especially so in young sponges.

Flesh spicules.—There are two types of flesh spicules, both of which are equibirotulates. In one type the rotules consist of 4 or 6 incurved hooks. The shafts are straight and bear several slightly curved spines, which are as long as the hooks of the rotules (fig. 4). These spicules measure 45μ to 55μ in length by 2.6μ to 3.8μ in diameter. The rotules are 8.7μ to 10.4μ in diameter. Both types of flesh spicules are abundant, but the type just described is more abundant than the following one. The rotules of the other type are knoblike and bear numerous spinelike rays, which are not all at one level (figs. 5, 6). The shafts are straight and may bear 1 or 2 minute spines. These spicules range from 35μ to 45μ in length by 3$^{+}\mu$ in diameter. The rotules range from 11μ to 20μ in diameter, including the spines.



FIGURES 1–9.—*Spongilla discoides*, new species: 1, Side view of gemmule (*a*, granular zone; *b*, polygons on surface of outer chitinous coat; *c*, area within disconnected line missing on one side of empty gemmules), ×113; 2, view of gemmule from edge of discus (*a*, rim formed by union of outer chitinous coats from both sides of gemmules), ×113; 3, portion of a section through gemmular coats (*a*, outer chitinous coat; *b*, inner chitinous coat; *c*, air cell; *d*, ridges of polygons of outer chitinous coat), ×460; 4, 5, flesh spicules, ×1,000; 6, rotule of a flesh spicule similar to but smaller than the one shown in figure 5, ×1,000; 7, 8, skeletal spicules, ×1,000; 9, dermal spicule, ×1,000.

Remarks.—The two types of skeletal spicules and the two types of flesh spicules readily establish the new species. The two types of flesh spicules resemble closely the gemmule spicules of *Heteromeyenia ryderi baleni* found in the same pond (Penney, 1931). It was at first thought that they were identical and that the *Heteromeyenia* spicules had been deposited in the parenchyma of the *Spongilla.* This idea, however, was soon given up, as the spicules are present in abundance in all the Spongillas examined. As a final proof, young sponges grown from the "reductien" (reduction bodies) of Müller (1911) show both mature spicules of these types and many developmental stages.

There are no gemmules heretofore described that are in the shape of a discus or in which the two chitinous coats are applied to each other over a greater part of the surface, or in which the granular zone is restricted to a particular portion of the gemmule. For a proper understanding of the true relationship of the chitinous coats, it will be necessary to study developmental stages. According to the diagnosis of the genus *Spongilla* given by Potts (1887), the gemmules are surrounded by spined acerates and the skeletal spicules are rarely spined. Gee (1930) gives a list of the known fresh-water sponges. Of these, reference to one genus only is probably necessary. Annandale (1913) describes the gemmules of *Nudospongilla* as "devoid of foramina, pneumatic coat and spicules, adherent at the base of the sponge, ovoid in outline and somewhat flattened." In the description of the type, *N. coggini*, he states that "gemmules of moderate size, few in number, flattened at the base, dome-shaped above, with a central indentation or concavity; their chitinous coat thin and brittle, covered by a delicate outer membrane in continuity with the basal membrane of the sponge." A new genus may be indicated, but until more sponges of a similar nature are described, it is better to consider this sponge as a greatly modified *Spongilla.*

This sponge has been reported before by the author (Penney, 1931) as an unidentified species of *Spongilla*, but it was not described. As stated above, collections were made throughout the year. During the summer of 1932 gemmules of this sponge were found in abundance floating at the surface of the pond. It is quite probable that this indicates the disintegration of a great number of sponges, as the pond, because of an extraordinary dry season, was greatly reduced in size, the shore line having retreated about 20 feet during the summer. Many of these floating gemmules were empty. No gemmules were observed in the process of liberating their contents, but the method by which this is done might be inferred from the appearance of the empty ones. A portion of one side of each gemmule, not including the granular zone, was lacking

(fig. 1, *c*). Since the gemmule has no foraminal aperture, one might reach the conclusion that at the time of maturity one side of the gemmule was ruptured and the contents liberated.

Holotype.—U.S.N.M. no. 22194 (1 specimen and 3 slides), from Horseshoe Pond, Lexington County, S.C.

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